

## PATENT COOPERATION TREATY

PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)



Applicant's or agent's file reference <b>PC-9269</b>	<b>FOR FURTHER ACTION</b>	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. <b>PCT/JP 2004/14300</b>	International filing date (day/month/year) <b>22.09.2004</b>	(Earliest) Priority Date (day/month/year) <b>25.09.2003</b>
Applicant <b>Kabushiki Kaisha Toshiba</b>		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box II).

3. ☐ **Unity of invention is lacking** (See Box III).

**4. With regard to the title,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

**5. With regard to the abstract,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

**6. With regard to the drawings,**

- a. the figure of the drawings to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP 2004/14300

## A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl<sup>7</sup> G11B5/65, 5/738, 5/667

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl<sup>7</sup> G11B5/62-5/858

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 Japanese Utility Model Gazette 1922-1996, Japanese Publication of Unexamined Utility Model Applications 1971-2004, Japanese Registered Utility Model Gazette 1994-2004, Japanese Gazette Containing the Utility Model 1996-2004

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2003-217107 A (FUJI ELECTRIC CO., LTD.) 2003.07.31 SEE WHOLE DOCUMENT & US 2004/27868 A1	1-5, 7-15 6
Y A	JP 2002-342908 A (SONY CORP.) 2002.11.29 [0030] - [0034] & US 2002/187368 A1	1-5, 7-15 6
Y A	JP 9-204651 A (TOKYO SHIBAURA ELECTRIC CO.) 1997.08.05 [0018] - [0020], [0024], [0062] - [0066] (Family: none)	1-5, 7-15 6
X	JP 2001-351217 A (FUJITSU LTD.) 2001.12.21 [0024] - [0047] (Family: none)	1

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

20.10.2004

Date of mailing of the international search report

02.11.2004

Name and mailing address of the ISA/JP

Japan Patent Office

3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan

Authorized officer

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# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY



**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:  
**SHIGA Masatake**

**2-3-1, Yaesu, Chuo-ku, Tokyo  
104-8453 Japan**

Date of mailing  
(day/month/year)

**02.11.2004**

Applicant's or agent's file reference

**PC-9269**

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

**PCT/JP2004/14300**

International filing date (day/month/year)

**22.09.2004**

Priority date (day/month/year)

**25.09.2003**

International Patent Classification (IPC) or both national classification and IPC

Int.Cl. **G11B5/65, 5/738, 5/667**

Applicant

**Kabushiki Kaisha Toshiba**

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP

**Japan Patent Office**

**3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan**

Authorized officer

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**3045**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP 2004/14300

Box No. I

Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/ 14300

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>2-15</u>	YES
	Claims	<u>1</u>	NO
Inventive step (IS)	Claims	<u>6</u>	YES
	Claims	<u>1-5, 7-15</u>	NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims		NO

2. Citations and explanations

Concerning claims 1-5,7-15

D1:JP 2003-217107 A(FUJI ELECTRIC CO., LTD.)

2003.07.31 SEE WHOLE DOCUMENT & US 2004/27868 A1

D2:JP 2002-342908 A(SONY CORP.)

2002.11.29 [0030]-[0034] & US 2002/187368 A1

D3:JP 9-204651 A(TOKYO SHIBAURA ELECTRIC CO.)

1997.08.05 [0018]-[0020],[0024],[0062]-[0066](Family: none)

The subject matter of claims 1-5,7-15 does not involve an inventive step over D1 in view of D2 and D3.

As D1 discloses, a perpendicular magnetic recording medium comprising a nonmagnetic under layer, a magneticlayer includes a ferromagnetic crystal grain and a nonmagnetic grain boundary region, and a protective layer stacked on a nonmagnetic substrate is well-known.

D2 discloses that it can isolate crystal grains of Co-Pt-Cr in a magnetic layer to use another oxide such as Cr oxides, Ti oxides, Zr oxides, Y oxides or the like in conjunction with Si oxides.

D3 discloses a perpendicular magnetic recording medium comprising a Co-Pt-SiO-MgO magneticlayer stacked on a nonmagnetic substrate.

The technical feature "a magneticlayer includes a ferromagnetic crystal grain and a nonmagnetic grain boundary region" in D1 and the feature "to use another oxide such as Cr oxides, Ti oxides, Zr oxides, Y oxides or the like in conjunction with Si oxides in a magnetic layer" in D2 or "a Co-Pt-SiO-MgO magneticlayer" in D3 are concerned with mutually related technical fields. Therefore, the skilled person in the art would easily conceive the idea of employing the feature in D2 or D3 to substitute the feature disclosed in D1.

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of: **Box No. V 2.**

**Concerning claim 1**

D4:JP 2001-351217 A(FUJITSU LTD.)

2001.12.21 [0024]-[0047](Family: none)

The subject matter of claim 1 does not appear to be novel with respect to D4.  
D4 discloses a magnetic recording medium comprising a nonmagnetic under layer, a magnetic layer includes a ferromagnetic crystal grain and a nonmagnetic grain boundary region, and a protective layer stacked on a nonmagnetic substrate, wherein said crystal grain boundary region includes another oxide such as Ge oxides, Sn oxides, B oxides or the like in conjunction with Si oxides.

**Concerning claim 6**

Claim 6 meets the requirements with respect to novelty and inventive step.  
D1-D4 do not disclose the relation between the content of the oxide selected from the group A and the content of the oxide selected from the group B.